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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/028,238      | 12/21/2001  | Mikio Oda            | NEKU 19.296         | 3180             |

26304 7590 08/18/2003

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EXAMINER

STULTZ, JESSICA T

ART UNIT

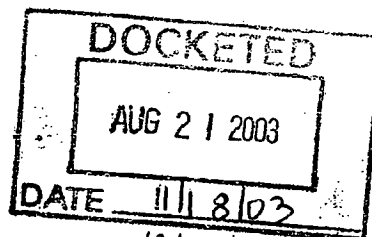
PAPER NUMBER

2873

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Please find below and/or attached an Office communication concerning this application or proceeding.



12/18/03  
1/18/04  
2/18/04



### Office Action Summary

Application No.

10/028,238

Applicant(s)

ODA ET AL.

Examiner

Jessica T Stultz

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 5/27/2003.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) 16-20 and 22-24 is/are withdrawn from consideration.
- 5) ☒ Claim(s) 14 and 21 is/are allowed.
- 6) ☒ Claim(s) 1-11, 13 and 15 is/are rejected.
- 7) ☒ Claim(s) 12 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 21 December 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

#### Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☒ All b) ☐ Some \* c) ☐ None of:  
1. ☒ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

#### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) Z. 6) ☐ Other:

## DETAILED ACTION

### *Claim Rejections - 35 USC § 112*

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.

Claims 2, 6, and 7 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claims 2, 6, and 7, the phrase "a second substrate movably provided for said first substrate" is unclear because it is vague as what the applicant is claiming as the limitation in the claim. The specification supports the limitation that "a second substrate which is movable relative to the first substrate" (this being the assumed meaning for purposes of examination).

### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 3, 4, 8, 10, 11, 13, and 15 are rejected under 35 U.S.C. 102(b) as being anticipated by Brotz.

Specifically regarding claim 1, Brotz discloses an optical path control apparatus comprising (Abstract, Column 2, line 44-Column 4, line 36, wherein the optical path control apparatus is shown in Figures 1-3): a first substrate (Column 2, lines 44-50, wherein the first substrate is "14", Figures 1-3); a second substrate which is movable relative to the first substrate

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(Column 2, line 44-Column 4, line 36, wherein the second substrate is the support member "12", Figure 5, shown in Figures 1-3); a mirror section provided on the second substrate to have a reflective surface with a fixedly predetermined angle with respect to a surface of the second substrate (Column 4, lines 31-49, wherein the mirror sections are "32", "40" and "41" which are fixed at an angle with respect to the surface of the second substrate "12", Figures 2-3); and a driving section which moves the second substrate such that a first optical path of input light to the mirror section is optically connected to one of a plurality of the second optical paths (Column 3, line 39-Column 4, line 17, wherein the driving section is the coils "20", "32", "68" and "70", Figures 1-3).

Regarding claim 3, examiner takes judicial notice that it is well known in the art of optical path control for the driving section to be an ultrasonic wave-generating source with a piezo-electric layer on the second substrate.

Regarding claim 4, Brotz further discloses an optical path control apparatus as is disclosed above wherein said driving means includes two electromagnets, said second substrate is a permanent magnet provided between said two electromagnets (Column 3, line 27-Column 4, line 17, wherein the electromagnets are coils "68" and "70" and support member "12" is magnetic, Figure 1), said permanent magnet is moved between two positions based on magnetic polarities of said two electromagnets (Column 3, line 27-Column 4, line 17, wherein the support member moves by the coils "68" and "70", Figure 1), and said first optical path is optically connected to said second optical path associated with one of said positions (Column 3, line 61-Column 4, line 17, wherein the path of the beam from laser "28" changes by movement of the mirror "10", or by the mirror sections "32", "40", and "41" respectively, Figure 1).

Regarding claim 10, Brotz discloses an optical path control apparatus comprising (Abstract, Column 2, line 44-Column 4, line 36, wherein the optical path control apparatus is shown in Figures 1-3); a substrate (Column 2, line 44-Column 4, line 36, wherein the substrate is the support member "12", Figure 5, shown in Figures 1-3) and a mirror section which has a reflective surface with a fixedly predetermined angle with respect to a surface of the substrate is provided on the substrate (Column 4, lines 31-49, wherein the mirror sections are "32", "40" and "41" which are fixed at an angle with respect to the surface of the second substrate "12", Figures 2-3) and changes an optical path of reflection light to input light by said mirror section in response to an input signal (Column 3, line 61-Column 4, line 17, wherein the path of the beam from laser "28" changes by movement of the mirror "10", or by the mirror sections "32", "40", and "41" respectively, Figure 1).

Specifically regarding claim 11, Brotz further discloses that the mirror section has two mirror portions (Column 4, lines 43-49, wherein the two mirror portions are "40" and "41", Figure 3), wherein each of the portions comprises: a mirror layer provided as a surface layer (Column 4, lines 31-49, wherein the mirror layer is the reflective top surface, Figures 1-3); an underside layer provided under said mirror layer having a conductive wire (Column 3, lines 27-38, wherein the underside layer "12" has a ferromagnetic ring, Figures 2 and 4), wherein the two mirror portions attract or repel each other based on current as the input signal supplied to the conductive wires such that a reflection angle of said mirror section is changed (Column 5, lines 17-27, wherein the mirror sections "56" and "58" repel and attract, Figure 5).

Specifically regarding claim 13, Brotz discloses that the mirror section has two mirror portions (Column 4, lines 43-49, wherein the two mirror portions are "40" and "41", Figure 3),

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wherein each of the portions comprises: a mirror layer provided as a surface layer; (Column 4, lines 31-49, wherein the mirror layer is the reflective top surface, Figures 1-3); a magnetic layer provided under said mirror layer, (Column 3, lines 27-38, wherein the underside layer "12" is magnetic, Figures 2 and 4); wherein said two mirror portions attract or repel each other through magnetization of said magnetic layer based on said input signal such that a reflection angle of said mirror section is changed (Column 5, lines 17-27, wherein the mirror sections "56" and "58" repel and attract, Figure 5).

Regarding claim 8 and 15, Brotz further discloses that the mirror section of the optical path control apparatus is a triangular prism shaped thin film mirror (Column 2, line 44-Column 4, line 36, wherein the mirrors are "32", "40", and "41", Figures 2-3).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Brotz in view of Hagelin et al.

Regarding claim 5, Brotz discloses the optical path control apparatus as disclosed above wherein the mirror section is provided on the second substrate via a base section (Column 2, lines 44-50, wherein the base section is "12", Figures 1-3), but does not specifically disclose that the second substrate has a gear shape wherein the driving section has an electrostatic actuator and rotates said second substrate based on force generated by said electrostatic actuator such that

said mirror section is rotated, or that first optical path is optically connected to said second optical path associated with a rotation angle of said mirror section. Hagelin et al teaches of an optical mirror system wherein the mirror section is provided on a second substrate via a base section (Column 3, lines 8-12, wherein the base section is "101" and the mirror section is "103", Figures 1-4), wherein the driving section has an electrostatic actuator and rotates the second substrate based on force generated by said electrostatic actuator (Column 3, lines 29-56 and Column 2, line 3-7, wherein the actuators are "302a-c and 304a-c", Figures 1-4) such that the mirror section is rotated so that mirror can rotate in many different directions (Column 5, lines 9-12). Hagelin does not specifically disclose that the first optical path is optically connected to said second optical path associated with a rotation angle of said mirror section and that the second substrate is a gear shape. However, it is obvious that the first optical path is optically connected to said second optical path associated with a rotation angle of said mirror section and that the gear shape of the second substrate is a matter of design choice and that the shape of the mirror is determined by the type of movement of the mirror needed for the reflection desired. Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to have the optical path control apparatus of Brotz to include the second substrate having a gear shape wherein the driving section has an electrostatic actuator, and wherein the driving section rotates the second substrate based on force generated by said electrostatic actuator such that said mirror section is rotated, and wherein the first optical path is optically connected to the second optical path associated with a rotation angle of said mirror section since Hagelin et al teaches of an optical mirror system wherein the mirror section is provided on a second substrate via a base section, wherein the driving section has an electrostatic actuator and rotates the second

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substrate based on force generated by said electrostatic actuator such that the mirror section is rotated so that mirror can rotate in many different directions.

Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Brotz.

Regarding claim 9, Brotz discloses the optical path control apparatus as disclosed above, but does not specifically disclose that the mirror section is a lump type. However, it is well known in the art of mirror shapes, that the lump type mirror is a matter of design choice and that the type of reflection desired determines the shape of the mirror. Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to have the claimed mirror be lump type so that the mirror can fit the type of reflection desired.

***Allowable Subject Matter***

Claims 2, 6, and 7 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action.

Claim 12 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claim 14 and 21 are allowed.

Specifically regarding claim 2, none of the prior art alone or in combination disclose or teach of the claimed optical path control apparatus as is disclosed above wherein the driving means is an ultrasonic wave generating source, and specifically wherein said second substrate is moved by progressive waves generated by said ultrasonic wave generating source and is located on a position by standing waves and said first optical path is optically connected to said second optical path associated with said position.



Specifically regarding claim 6, none of the prior art alone or in combination disclose or teach of the claimed optical path control apparatus as is disclosed above specifically wherein the second substrate has a micro-light wheel, the driving section has lasers, and the second substrate rotates based on laser beams emitted by said lasers, and said first optical path is optically connected to said second optical path associated with a rotation angle of said mirror section.

Specifically regarding claim 7, none of the prior art alone or in combination disclose or teach of the claimed optical path control apparatus as is disclosed above specifically wherein the second substrate is provided a concave section of the first substrate, wherein the concave section is filled with fluid; further wherein said driving section moves the second substrate by supplying the fluid from one end of the concave section and absorbing fluid from another end of the concave section, said mirror section reflects said input light based on the movement of the second substrate so that the first optical path is optically connected to the second optical path.

Specifically regarding claim 12, none of the prior art alone or in combination disclose or teach of the claimed optical path control apparatus as is disclosed above wherein the mirror section comprises: a mirror layer provided as a surface layer; and specifically a layer changing its shape in response to the input signal, an electrode layer provided under the layer changing its shape, wherein the mirror portion is transformed through transformation of the layer changing its shape in response to supply of the input signal such that a reflection angle of the mirror section is changed.

Specifically regarding claim 14, none of the prior art alone or in combination disclose or teach of the claimed optical path control apparatus as is disclosed above wherein the said mirror section comprises: a mirror layer provided as a surface layer; specifically a shape memory layer

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provided under said mirror layer, and a heating layer provided under said shape memory layer; wherein said mirror layer of said mirror section is transformed due to transformation of said shape memory layer through heating by said heating layer in response to said input signal such that a reflection angle of said mirror section is changed.

Specifically regarding claim 21, none of the prior art alone or in combination disclose or teach of the claimed optical path control apparatus as is disclosed above specifically wherein a mirror section is provided on a surface of the first substrate having a reflective surface with an angle larger than zero with respect to a surface of the first substrate.

#### ***Response to Arguments***

Applicant's arguments with respect to claims 1, 3, 4-5, 8, 9-10, 15, and 21 have been considered but are moot in view of the new ground(s) of rejection.

#### ***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Muller et al and Jain are cited as being some similar structure to the claimed invention.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period

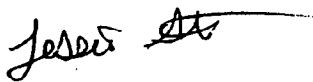
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will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jessica T Stultz whose telephone number is (703) 305-6106. The examiner can normally be reached on M-Th 7:30-5, and alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Georgia Epps can be reached on 703-308-4883. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.



Jessica Stultz  
August 1, 2003



JORDAN SCHWARTZ  
PRIMARY EXAMINER

**Notice of References Cited**

Application/Control No.

10/028,238

Applicant(s)/Patent Under  
Reexamination  
ODA ET AL.

Examiner

Jessica T Stultz

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**U.S. PATENT DOCUMENTS**

| * |   | Document Number<br>Country Code-Number-Kind Code | Date<br>MM-YYYY | Name              | Classification |
|---|---|--|-----------------|-------------------|----------------|
|   | A | US-5,684,616                                     | 11-1997         | Brotz, Gregory R. | 359/198        |
|   | B | US-6,583,914                                     | 06-2003         | Muller et al.     | 359/212        |
|   | C | US-5,450,246                                     | 09-1995         | Jain, Kanti       | 359/877        |
|   | D | US-  |                 |                   |                |
|   | E | US-  |                 |                   |                |
|   | F | US-  |                 |                   |                |
|   | G | US-  |                 |                   |                |
|   | H | US-  |                 |                   |                |
|   | I | US-  |                 |                   |                |
|   | J | US-  |                 |                   |                |
|   | K | US-  |                 |                   |                |
|   | L | US-  |                 |                   |                |
|   | M | US-  |                 |                   |                |

**FOREIGN PATENT DOCUMENTS**

| * |   | Document Number<br>Country Code-Number-Kind Code | Date<br>MM-YYYY | Country | Name | Classification |
|---|---|--|-----------------|---------|------|----------------|
|   | N |  |                 |         |      |                |
|   | O |  |                 |         |      |                |
|   | P |  |                 |         |      |                |
|   | Q |  |                 |         |      |                |
|   | R |  |                 |         |      |                |
|   | S |  |                 |         |      |                |
|   | T |  |                 |         |      |                |

**NON-PATENT DOCUMENTS**

| * |   | Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages) |
|---|---|---|
|   | U |   |
|   | V |   |
|   | W |   |
|   | X |   |

\*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)  
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

U.S. Patent and Trademark Office  
PTO-892 (Rev. 01-2001)

*Jessica T Stultz*  
Notice of References Cited

Part of Paper No. 11